UNCLASSIFIED

GENERAL BACKGROUND OF THE X-15 RESEARCH-AIRPLANE PROJECT

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Chairman of Research Airplane Committee

During the spring of 1952, a resolution was passed by the NACA Committee on Aerodynamics and ratified by the NACA Executive Committee directing the Laboratories to initiate studies of the problems likely to be encountered in space flight and of the methods of exploring them. Laboratory techniques, missiles, and manned airplanes were considered. By the spring of 1954 the NACA had a team at work to determine the characteristics of an airplane suitable for exploratory flight studies of the aerodynamic heating, stability, control, and physiological problems of hypersonic and space flight and to determine the technical feasibility of designing and building such an airplane. This work led to an NACA proposal for the construction of an airplane capable of a speed of 6,600 feet per second and an altitude of 250,000 feet, both not necessarily to be attained simultaneously. The performance that would have to be built into an airplane that would meet these two requirements would permit the desired exploration. It was suggested that a heat-sink type of structure of Inconel X would require the least development and would give a reasonable factor of safety, when the assumptions that had to be made in the light of the knowledge then available were considered.

When, on July 9, 1954, NACA representatives met with members of the Air Force and Bureau of Aeronautics research and development groups to present the proposal as an extension of the cooperative research airplane program, it was discovered that the Air Force Scientific Advisory Board had been making similar proposals to the Air Force Headquarters and that the Office of Naval Research had an active contract to determine the feasibility of constructing a manned aircraft capable of climbing to an altitude of 1,000,000 feet. These independent actions on the part of the Air Force and the Navy made for early acceptance of the NACA proposal for a joint effort and eventually led to the X-15 project.

On October 5, 1954, the NACA Committee on Aerodynamics adopted the following resolution:

WHEREAS, The necessity of maintaining supremacy in the air continues to place great urgency on solving the problems of flight with man-carrying aircraft at greater speeds and extreme altitudes, and

WHEREAS, Propulsion systems are now capable of propelling such aircraft to speeds and altitudes that impose entirely new and unexplored aircraft design problems, and

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WHEREAS, It now appears feasible to construct a research airplane capable of initial exploration of these problems,

BE IT HEREBY RESOLVED, That the Committee on Aerodynamics endorses the proposal of the immediate initiation of a project to design and construct a research airplane capable of achieving speeds of the order of Mach number 7 and altitudes of several hundred thousand feet for the exploration of the problems of stability and control of manned aircraft and aerodynamic heating in the severe form associated with flight at extreme speeds and altitudes.

Because of the magnitude of the anticipated cost of the project, which would require support from Defense Department emergency funds as well as Air Force and Navy research and development funds, a relatively formal memorandum of understanding based on the resolution was prepared and signed in December 1954 by the Special Assistant, Research and Development of the Air Force, the Assistant Secretary of the Navy for Air, and the Director of the NACA. The memorandum provided that technical direction of the project would be the responsibility of the Director of the NACA acting with the advice and assistance of a "Research Airplane Committee" composed of one representative each from the Air Force, the Navy, and the NACA. Administration of the design and construction phases of the project was assigned to the Air Force. The NACA was given the task of conducting the flight tests after acceptance of the airplane as an airworthy article. The Director of the NACA and the Research Airplane Committee were charged with the responsibility of informing the military services and the aircraft industry of the progress and results of the project. The concluding statement of the memorandum was: "Accomplishment of this project is a matter of national urgency." The full text of the memorandum is appended to this paper.

After the Department of Defense approval was obtained, the Air Force was authorized in December 1955 to issue invitations to contractors having experience in the design of fighter-type airplanes to participate in the design competition for the X-15 airplane. A formal briefing on the specifications was presented in January 1955 to representatives of the 10 companies that exhibited an interest in the competition. Bids were received from four of the companies and evaluated during the summer and fall of 1955. The go-ahead signal was finally given to North American Aviation, Inc., the winner of the competition in early December 1955. The detail design and development, therefore, have been under way for not quite a year at this time.

The memorandum of understanding provides for the dissemination of technical information regarding the progress and results of the project to the military services and the aircraft industry. This conference will be a report on the progress of the project to this time. It is the first

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such meeting and others will follow in due course. It should not be expected that these meetings will be held frequently because it takes time to accumulate sufficient significant data to warrant taking such a large group of this type away from its work.

Because this is the first of these meetings, some of the technical background for the original NACA proposal and the status of the current research-airplane flying experience in addition to reports on the progress of the X-15 project will be given.

Two final points should be noted relative to the X-15 project and this current progress report. First, in line with the urgency expressed in the memorandum of understanding, the project is proceeding on an expedited basis with the intent of realizing flights of a man-carrying aircraft at hypersonic speeds and high altitudes as soon as possible for explorations to separate the real from the imagined problems and to make known the overlooked and the unexpected problems. For this reason, no attempt has been made to optimize the configuration or, generally speaking, to use unconventional methods of approach to the problems expected. The second point is that the research and development connected with the project are not completed at the time of this conference. In the papers presented in this conference, it may be noted that the airplane configurations discussed and their stated weights vary from paper to paper. This apparent inconsistency results from the fact that the airplane configuration is still not completely firm and the figures represent those current at the time the particular studies were started. It should be borne in mind that some of the tentative conclusions for certain of the problems may be discarded in the future as new data are obtained.

MEMORANDUM OF UNDERSTANDING

SUBJECT: Principles for the Conduct by the NACA, Navy, and Air Force of a Joint Project for a New High-Speed Research Airplane

A. A project for a high-speed research airplane shall be conducted jointly by the NACA, the Navy, and the Air Force to implement the recommendations of the NACA Committee on Aerodynamics, as adopted on 5 October 1954.

B. Technical direction of the project will be the responsibility of the Director, NACA, acting with the advice and assistance of a "Research Airplane Committee" composed of one representative each from the NACA, Navy, and Air Force.

C. Financing of the design and construction phases of the project shall be determined jointly by the Navy and Air Force.

D. Administration of the design and construction phases of the project shall be performed by the Air Force in accordance with the technical direction as prescribed in paragraph B.

E. The design and construction of the project shall be conducted through a negotiated contract (with supplemental prime or subcontracts) obtained after evaluating competitive proposals invited from competent industry sources. The basis for soliciting proposals will be the characteristics determined by the configuration on which the NACA has already done much preliminary design work.

F. Upon acceptance of the airplane and its related equipment from the contractor, it will be turned over to the NACA, who shall conduct the flight tests and report the results of same.

G. The Director, NACA, acting with the advice and assistance of the Research Airplane Committee, will be responsible for making periodic progress reports, calling conferences, and disseminating technical information regarding the progress and results of the

project by other appropriate media subject to the applicable laws and executive orders for the safeguarding of classified security information.

H. Accomplishment of this project is a matter of national urgency.

1 Incl
Resolution Adopted by
NACA Committee on
Aerodynamics, October 5, 1954

Hugh L. Dryden
Director, NACA

J. H. Smith, Jr.
Assistant Secretary of the Navy (Air)

Trevor Gardner
Special Assistant (R & D) Air Force

Signing of this document was completed on December 23, 1954.